



Topologically Coherent Stationary Non-Homogeneous Flows

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Systems may be encoded as thermodynamic systems far from equilibrium in terms of one or more exterior differential 1-forms A . Processes may be encoded in terms of Vector or Macroscopic Spinor direction fields, V . The non-linear dynamics is described by Cartan's magic formula in terms of the Lie differential with respect to V acting on the 1-form, A ; the result is a dynamical equivalent to the first law of thermodynamics. The method includes most phenomenological hydrodynamic and Plasma formulations, which are elements of different topological categories that depend upon the Pfaff; topological (not geometric) dimension used to encode the system. Systems far from equilibrium imply that the system topological dimension is 3 or greater (no matter what geometric dimension is utilized). Wakes and tangential discontinuities, and chaotic processes, are artifacts of Contact submanifolds of topological dimension 3, where turbulent irreversible processes are artifacts of Symplectic manifolds of topological dimension 4. The direction fields of processes in Symplectic manifolds always have Macroscopic Spinor components, which are the source of topological fluctuations and thermodynamic irreversibility. Examples will be presented.